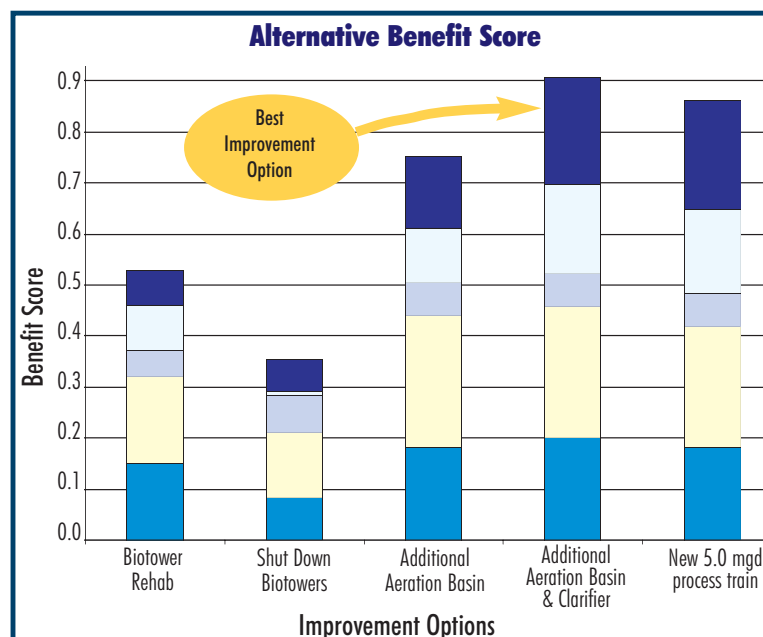


## Solutions

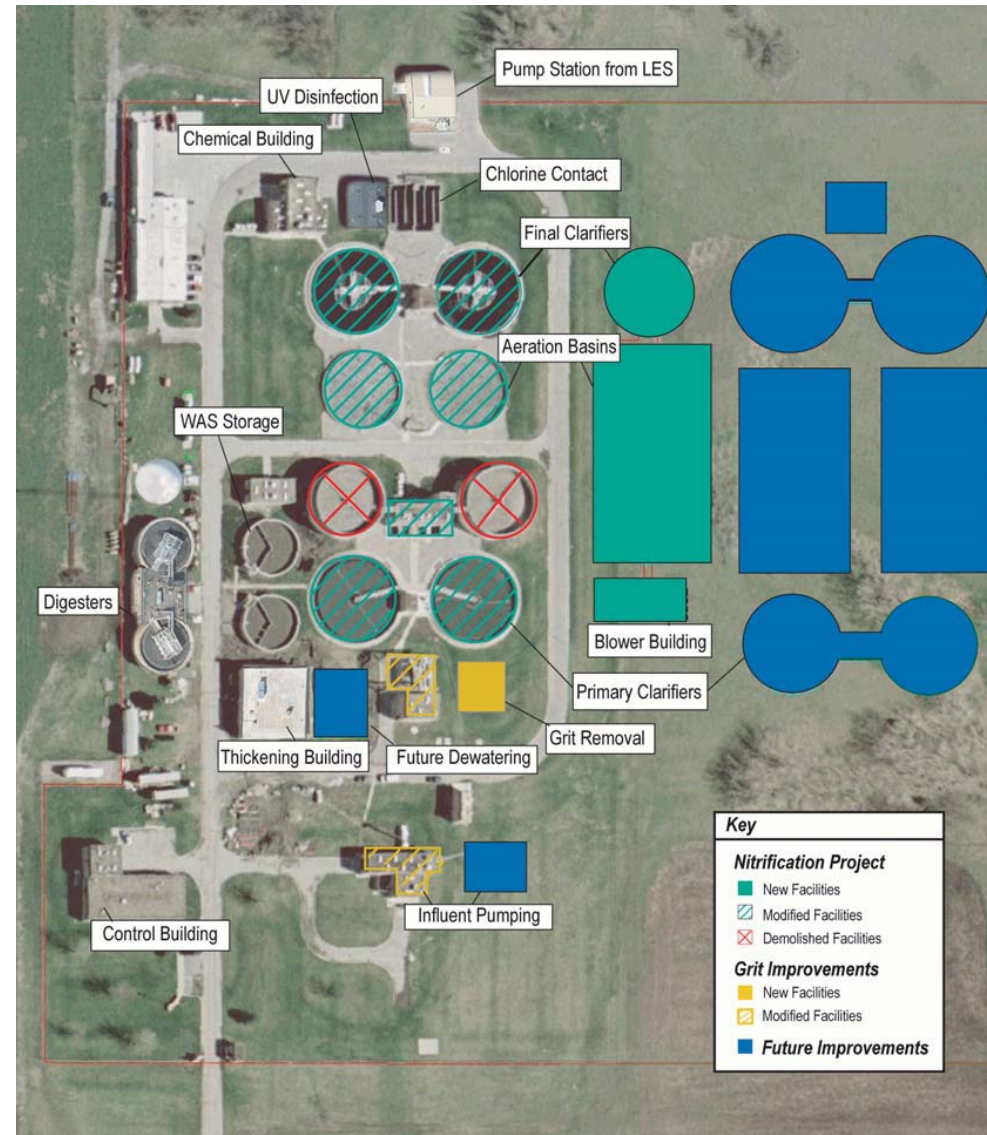
**LWWS and their Consultants** examined over 10 alternative solutions to find the best approach to meet the regulatory requirements, rehabilitation requirements and future capacity needs. To assist in the decision making process, five of the most promising alternatives were evaluated in a workshop setting using special analytical software. In this process, each alternative was evaluated based on:

- Reliability - Resources to meet/exceed proposed permit limits
- Operational Issues - Flexibility to vary the level of treatment provided and simplify operations and maintenance
- Implementation and Public Issues - Ability to maximize use of the existing facilities and public perception of how the project looks or other concerns
- Capacity Achieved - Capability to support current needs and projected growth
- Future Considerations - Flexibility to meet anticipated future permit limits and excess flow treatment requirements

**Best Alternative** - The graphic below compares the benefit score of each of the alternatives. The higher the bar, the greater benefit score the alternative received in the evaluation. Cost was also included to develop a cost/benefit ratio. The alternative with the additional aeration basins and clarifier scored the highest benefit score and had the lowest cost/benefit ratio, confirming this alternative was the best option for improvements at the Northeast WWTF.



## Northeast Wastewater Treatment Facility Expansion Plan



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**Lincoln Wastewater System**  
**Department of Public Works**  
**and Utilities**



**Northeast**  
**Wastewater**  
**Treatment Facility**  
**Improvements**



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About the Utility

Northeast Wastewater Treatment Facility

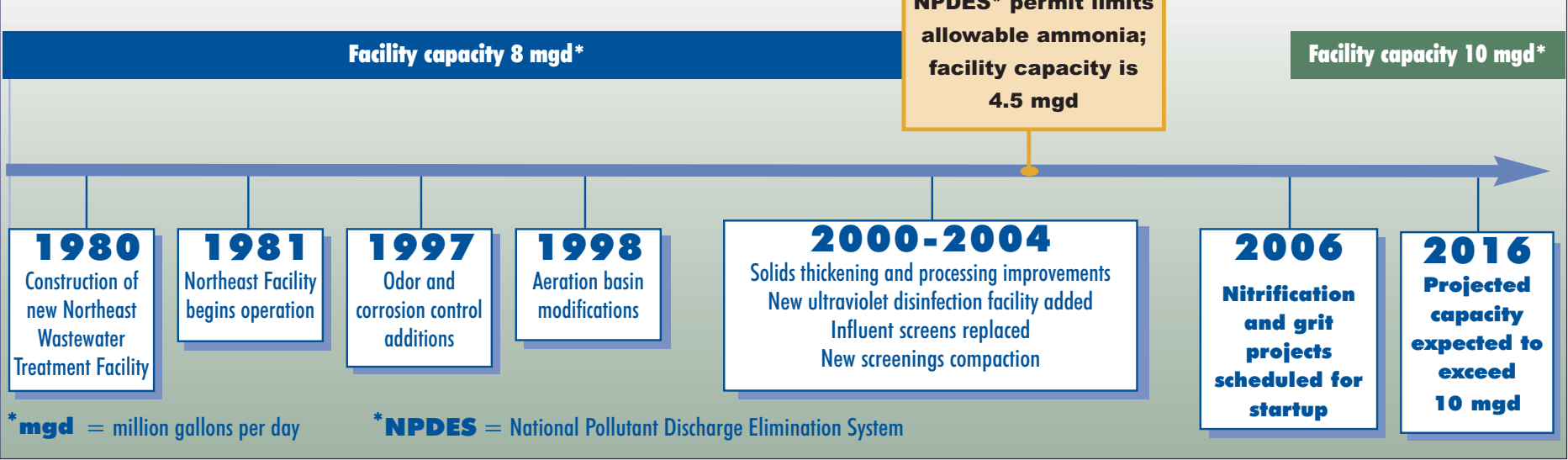
Lincoln, Nebraska



If you're like most people, the only time you think about what happens to wastewater is when the treatment process doesn't work seamlessly. But behind the scenes of every city in America, wastewater treatment facilities work 24/7 to ensure that wastewater and solids are properly treated and purified. Ensuring that wastewater services and treatment are uninterrupted is a full time job for over 100 employees of the **Lincoln Wastewater System (LWWS)**, part of the City of Lincoln, Public Works and Utilities Department. As a department of the City, LWWS has no taxing authority and relies primarily on user fees for revenue.

LWWS operates and maintains two wastewater treatment facilities for its over 225,000 residents. The newer of the two, the **Northeast Wastewater Treatment Facility (WWTF)**, began operation in 1981.

Timeline of Improvements



Challenges

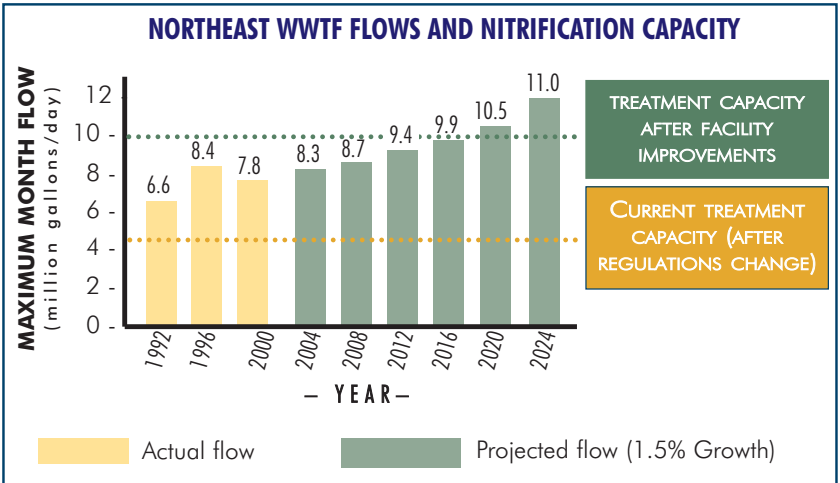
There are several pressing issues that the LWWS will need to address in the immediate future at the Northeast Facility. The most urgent issue is the need to comply with environmental regulations that affect how the wastewater is treated. A second need is to repair or replace some of the facility's original components. Lastly, the facility will need to expand to support future growth and demand for wastewater treatment.

Challenge 1 - Regulations



The Nebraska Surface Water Quality Standards regulate the concentration of ammonia and other constituents that can be discharged from wastewater treatment facilities. Over the past 10 years, the City of Lincoln has carefully monitored the stream conditions and aquatic life in Salt Creek, and has worked closely with the Nebraska Department of Environmental Quality to understand ammonia's effects and to define the limits for permitted concentrations.

**LWWS** is meeting the challenge of the new National Pollutant Discharge Elimination System (NPDES) ammonia limits by implementing a process called nitrification to reduce the ammonia in the wastewater. Although nitrification is the best solution for lowering ammonia levels, the main disadvantage is that it lengthens the amount of time it takes to treat the water, which in essence reduces the treatment capacity of the existing facility. The current capacity of the treatment facility is 8 million gallons per day (MGD). This will decrease to approximately 4.5 mgd once the facility is operating in nitrification mode. Since the amount of flow LWWS processes on an average day is approximately 6.5 to 7.0 mgd, the facility will not be able to meet future growth and development needs when the new ammonia limits take effect.



Challenge 2 - Rehabilitation

If you think about a house, you would expect some parts, like the furnace or roof, to wear out over time and need replacing. Wastewater treatment facilities are very similar. The LWWS has been very proactive with its maintenance program to keep the pumps, pipes and other major process components in tip-top shape. In fact, the City has kept many of those components operational for over 20 years, whereas the average lifespan of wastewater equipment is typically only 15 to 20 years. There comes a point, however, when major process equipment must be replaced. Since LWWS needs to make improvements as a result of the regulatory changes, it makes financial sense to replace those aging systems now.

Grit Handling Improvements

One major rehabilitation and capacity need is the grit handling facility. Grit is heavy, inorganic material such as sand that goes into the sewers and then the wastewater plant. Grit is very damaging to pumping equipment and settles out in the plant's anaerobic digesters, robbing the digesters of solids stabilizing capacity. The grit project will improve grit capture at the facility and minimize operations labor costs through automation.

Challenge 3 - Planning for the Future

The Lincoln-Lancaster County Planning Department's population projections indicate that the historical growth trend is expected to continue. According to their figures, the population will grow by approximatelyburden existing wastewater collection and treatment facilities, especially since current treatment capacity will be significantly reduced following the existing wastewater collection and treatment facilities will be required to meet this future growth and development. Planned improvements will bring the capacity of the Northeast WWTF to approximately 10 mgd. According to planning estimates, this capacity will be sufficient to treat the maximum month flows anticipated at the facility through 2015.